

Date: January 22, 1970

From: [redacted]

To: [redacted]

Re: Color Problem

I contacted Professor [redacted] and [redacted] regarding the color problem under consideration. The consensus of opinion is that we simply do not know enough to predict the efficacy of the proposed system. All agree, including myself, that the idea must be tested experimentally before any conclusions can be drawn.

The basis for this conclusion rests on the inability to predict the discriminatory ability of the eye under the complex conditions which will operate in this situation. For example, consider a red object on a green background. If the green and blue components are reduced and the red increased, the brightness contrast between the red and its surrounding borders will be accentuated. At the same time, color contrast will be reduced. Thus we are simultaneously increasing brightness and decreasing color contrast.

The problem is formally similar to that discussed with [redacted] during our visit with him in December. The trade-off between color and brightness contrast depends on the nature of the border, surround, etc.

Another difficulty which arises is based on the data by [redacted] which show that hue discrimination is better with a red surround than with a green surround. These data are contrary to expectations as one might reasonably predict that the red background would "fatigue" the red receptors thereby making them less sensitive. But such is not the case, and in view of the fact that these data are completely unpredictable, points to the necessity of empirical research with respect to the present problem.

It is interesting to point out that [redacted] who with his wife has as much information about the theoretical aspects of color vision as anyone in the world, was quick to emphasize that the present state of the art does simply not permit us to make predictions under the complex viewing conditions under consideration.

With the information at hand, I would suggest that tests be made to test out the ideas empirically. As an alternative, the problem could be submitted to the Vision Committee which at one time had a working group on color displays.

[redacted]

Declass Review by NIMA/DOD

Status Report Through 12 December, 1969

Direct consultation with sponsor's representatives re:  
contractors, evaluation of new techniques, research  
strategy, feasibility studies, liaison with related  
individuals and groups

With sponsor's contractors regarding microscope design  
studies, planning of research, services as a subject,  
evaluation of data, future plans

With sponsor's A.F. contractor re: evaluation of proposed  
peripheral vision displays

Supervision of technical assistants carrying out literature  
surveys for sponsor (three dimensional displays,  
measurement of accommodation)

Development of measurement techniques, literature surveys,  
personal contacts, misc.

Percentage fiscal year funds spent or encumbered as of  
12 December, 1969

Cost breakdown for fiscal year:

Travel (H.L. only)

Technical Assistant, including travel

Consulting

Other (postage, xerox, etc.)

STAT